# RED SEAL

THE INTERPROVINCIAL STANDARDS RED SEAL PROGRAM

## National Occupational Analysis

2010

# Ironworker (Structural/Ornamental)

Human Resources and Skills Development Canada
Ressources humaines et Développement des compétences Canada
Canada

**Occupational Analyses Series**

# Ironworker (Structural/Ornamental)

**2010**


| | |
|---|---|
| Trades and Apprenticeship Division | Division des métiers et de l'apprentissage |
| Workplace Partnerships Directorate | Direction des partenariats en milieu de travail |
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# FOREWORD

***The Canadian Council of Directors of Apprenticeship (CCDA) recognizes this National Occupational Analysis as the national standard for the occupation of ironworker (structural/ornamental).***

## Background

The first National Conference on Apprenticeship in Trades and Industries, held in Ottawa in 1952, recommended that the federal government be requested to cooperate with provincial and territorial apprenticeship committees and officials in preparing analyses of a number of skilled occupations. To this end, Human Resources and Skills Development Canada (HRSDC) sponsors a program, under the guidance of the CCDA, to develop a series of National Occupational Analyses (NOAs).

The NOAs have the following objectives:

- to describe and group the tasks performed by skilled workers;
- to identify which tasks are performed in every province and territory;
- to develop instruments for use in the preparation of Interprovincial Red Seal Examinations and curricula for training leading to the certification of skilled workers;
- to facilitate the mobility of apprentices and skilled workers in Canada; and,
- to supply employers, employees, associations, industries, training institutions and governments with analyses of occupations.

# ACKNOWLEDGEMENTS

The CCDA and HRSDC wish to express sincere appreciation for the contribution of the many tradespersons, industrial establishments, professional associations, labour organizations, provincial and territorial government departments and agencies, and all others who contributed to this publication.

Special acknowledgement is extended by HRSDC and the CCDA to the representatives from the trade across Canada who contributed to the development of this document.

This analysis was prepared by the Workplace Partnerships Directorate of HRSDC. The coordinating, facilitating and processing of this analysis were undertaken by employees of the NOA development team of the Trades and Apprenticeship Division. Barry Yerex for the host jurisdiction of Alberta also participated in the development of this NOA.

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# LIST OF PUBLISHED NATIONAL OCCUPATIONAL ANALYSES (Red Seal Trades)

| Title | NOC Code* |
|---|---|
| Agricultural Equipment Technician (2007) | 7312 |
| Appliance Service Technician (2005) | 7332 |
| Automotive Painter (2009) | 7322 |
| Automotive Service Technician (2009) | 7321 |
| Baker (2006) | 6252 |
| Boilermaker (2008) | 7262 |
| Bricklayer (2007) | 7281 |
| Cabinetmaker (2007) | 7272 |
| Carpenter (2010) | 7271 |
| Concrete Finisher (2006) | 7282 |
| Construction Craft Worker (2009) | 7611 |
| Construction Electrician (2008) | 7241 |
| Cook (2008) | 6242 |
| Electrical Rewind Mechanic (1999) | 7333 |
| Electronics Technician – Consumer Products (1997) | 2242 |
| Floorcovering Installer (2005) | 7295 |
| Glazier (2008) | 7292 |
| Hairstylist (2009) | 6271 |
| Heavy Duty Equipment Technician (2009) | 7312 |
| Industrial Electrician (2008) | 7242 |
| Industrial Mechanic (Millwright) (2009) | 7311 |
| Instrumentation and Control Technician (2010) | 2243 |
| Insulator (Heat and Frost) (2007) | 7293 |
| Ironworker (Generalist) (2010) | 7264 |
| Ironworker (Reinforcing) (2010) | 7264 |
| Ironworker (Structural/Ornamental) (2010) | 7264 |
| Landscape Horticulturist (2010) | 2225 |

* National Occupational Classification

| TITLE | NOC Code |
|---|---|
| Lather (Interior Systems Mechanic) (2007) | 7284 |
| Machinist (2010) | 7231 |
| Metal Fabricator (Fitter) (2008) | 7263 |
| Mobile Crane Operator (2009) | 7371 |
| Motorcycle Mechanic (2006) | 7334 |
| Motor Vehicle Body Repairer (Metal and Paint) (2010) | 7322 |
| Oil Burner Mechanic (2006) | 7331 |
| Painter and Decorator (2007) | 7294 |
| Partsperson (2010) | 1472 |
| Plumber (2008) | 7251 |
| Powerline Technician (2009) | 7244 |
| Recreation Vehicle Service Technician (2006) | 7383 |
| Refrigeration and Air Conditioning Mechanic (2009) | 7313 |
| Rig Technician (2008) | 8232 |
| Roofer (2006) | 7291 |
| Sheet Metal Worker (2010) | 7261 |
| Sprinkler System Installer (2009) | 7252 |
| Steamfitter/Pipefitter (2010) | 7252 |
| Tilesetter (2010) | 7283 |
| Tool and Die Maker (2005) | 7232 |
| Transport Trailer Technician (2008) | 7321 |
| Truck and Transport Mechanic (2010) | 7321 |
| Welder (2009) | 7265 |

**Requests for printed copies of National Occupational Analyses may be forwarded to:**

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Gatineau, Quebec K1A 0J9

**These publications can be ordered or downloaded online at: www.red-seal.ca. Links to Essential Skills Profiles for some of these trades are also available on this website.**

# STRUCTURE OF ANALYSIS

To facilitate understanding of the occupation, the work performed by tradespersons is divided into the following categories:

| | |
|---|---|
| **Blocks** | the largest division within the analysis that is comprised of a distinct set of trade activities |
| **Tasks** | distinct actions that describe the activities within a block |
| **Sub-Tasks** | distinct actions that describe the activities within a task |
| **Supporting Knowledge and Abilities** | the elements of skill and knowledge that an individual must acquire to adequately perform the sub-task |

The analysis also provides the following information:

| | |
|---|---|
| **Trends** | changes identified that impact or will impact the trade including work practices, technological advances, and new materials and equipment |
| **Related Components** | a list of products, items, materials and other elements relevant to the block |
| **Tools and Equipment** | categories of tools and equipment used to perform all tasks in the block; these tools and equipment are listed in Appendix A |

The appendices located at the end of the analysis are described as follows:

| | |
|---|---|
| **Appendix A — Tools and Equipment** | a non-exhaustive list of tools and equipment used in this trade |
| **Appendix B — Glossary** | definitions or explanations of selected technical terms used in the analysis |
| **Appendix C — Acronyms** | a list of acronyms used in the analysis with their full name |
| **Appendix D — Block and Task Weighting** | the block and task percentages submitted by each jurisdiction, and the national averages of these percentages; these national averages determine the number of questions for each block and task in the Interprovincial exam |
| **Appendix E — Pie Chart** | a graph which depicts the national percentages of exam questions assigned to blocks |
| **Appendix F — Task Profile Chart** | a chart which outlines graphically the blocks, tasks and sub-tasks of this analysis |

# DEVELOPMENT AND VALIDATION OF ANALYSIS

### Development of Analysis

A draft analysis is developed by a committee of industry experts in the field led by a team of facilitators from HRSDC. This draft analysis breaks down all the tasks performed in the occupation and describes the knowledge and abilities required for a tradesperson to demonstrate competence in the trade.

### Draft Review

The NOA development team then forwards a copy of the analysis and its translation to provincial and territorial authorities for a review of its content and structure. Their recommendations are assessed and incorporated into the analysis.

### Validation and Weighting

The analysis is sent to all provinces and territories for validation and weighting. Participating jurisdictions consult with industry to validate and weight the document, examining the blocks, tasks and sub-tasks of the analysis as follows:

| | |
|---|---|
| **BLOCKS** | Each jurisdiction assigns a percentage of questions to each block for an examination that would cover the entire trade. |
| **TASKS** | Each jurisdiction assigns a percentage of exam questions to each task within a block. |
| **SUB-TASKS** | Each jurisdiction indicates, with a YES or NO, whether or not each sub-task is performed by skilled workers within the occupation in its jurisdiction. |

The results of this exercise are submitted to the NOA development team who then analyzes the data and incorporates it into the document. The NOA provides the individual jurisdictional validation results as well as the national averages of all responses. The national averages for block and task weighting guide the Interprovincial Red Seal Examination plan for the trade.

This method for the validation of the NOA also identifies common core sub-tasks across Canada for the occupation. If at least 70% of the responding jurisdictions perform a sub-task, it shall be considered common core. Interprovincial Red Seal Examinations are based on the common core sub-tasks identified through this validation process.

## Definitions for Validation and Weighting

| | |
|---|---|
| **YES** | sub-task performed by qualified workers in the occupation in a specific jurisdiction |
| **NO** | sub-task not performed by qualified workers in the occupation in a specific jurisdiction |
| **NV** | analysis Not Validated by a province/territory |
| **ND** | trade Not Designated in a province/territory |
| **NOT COMMON CORE (NCC)** | sub-task, task or block performed by less than 70% of responding jurisdictions; these will not be tested by the Interprovincial Red Seal Examination for the trade |
| **NATIONAL AVERAGES %** | average percentage of questions assigned to each block and task in Interprovincial Red Seal Examination for the trade |

## Provincial/Territorial Abbreviations

| | |
|---|---|
| **NL** | Newfoundland and Labrador |
| **NS** | Nova Scotia |
| **PE** | Prince Edward Island |
| **NB** | New Brunswick |
| **QC** | Quebec |
| **ON** | Ontario |
| **MB** | Manitoba |
| **SK** | Saskatchewan |
| **AB** | Alberta |
| **BC** | British Columbia |
| **NT** | Northwest Territories |
| **YT** | Yukon Territory |
| **NU** | Nunavut |

# ANALYSIS

# SAFETY

Safe working procedures and conditions, accident prevention and the preservation of health are of primary importance to industry in Canada. These responsibilities are shared and require the joint efforts of government, employers and employees. It is imperative that all parties are aware of circumstances and conditions that may lead to injury or harm. Safe learning experiences and environments can be created by controlling the variables and behaviours that may contribute to accidents or injury.

It is generally recognized that a safety-conscious attitude and work practices contribute to a healthy, safe and accident-free working environment.

It is imperative to apply and be familiar with the Occupational Health and Safety Acts and Workplace Hazardous Material Information System (WHMIS) Regulations. As well, it is essential to determine workplace hazards and take measures to protect oneself, co-workers, the public and the environment.

As safety education is an integral part of training in all jurisdictions, personal safety practices are not recorded in this document. However, the technical safety aspect relating to each task and sub-task are included throughout this analysis.

# SCOPE OF THE IRONWORKER (STRUCTURAL/ORNAMENTAL) TRADE

"Ironworker (Structural/Ornamental)" is this trade's official Red Seal occupational title approved by the CCDA. This analysis covers tasks performed by an ironworker (structural/ornamental) whose occupational title has been identified by some provinces and territories of Canada under the following names:

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ironworker (Structural/Ornamental) | ✓ | ✓ | ✓ | | | | | | ✓ | ✓ | | | |
| Ironworker - Structural and Ornamental | | | | | | ✓ | | | | | | | |
| Ironworker Structural | | | | | | | | ✓ | | | | | |

Ironworkers (Structural/Ornamental) install and reinforce structural/ornamental steel components, precast structural concrete members and glued laminated timber products (glulam) in commercial, industrial, institutional and large residential buildings, towers, bridges and stadiums. They erect pre-engineered buildings and ornamental ironwork such as curtain walls, metal stairways, catwalks, railings and metal doors. They also erect scaffolding, cranes, hoists and derricks on the construction site. Ironworkers (structural/ornamental) also install conveyors, machinery and automated material handling systems. They are also involved in demolition and salvage duties involving all types of construction.

They prepare the construction site by assembling the hoisting equipment. They unload structural and ornamental components and organize the material for hoisting as needed. They organize the hoisting of the components by connecting cables and slings to the components and directing crane operators. They position, align and secure components according to blueprints using a variety of fastening methods.

Ironworkers (Structural/Ornamental) generally work outside in all weather, although some work indoors in manufacturing plants. They generally travel to and from the work site which may be in a variety of locations ranging from remote areas where they could be working on dams, bridges or mining projects to urban environments where they could work on high rise buildings or stadiums. The work often requires considerable standing, bending, crawling, lifting, climbing, pulling and reaching, and is often conducted in cramped, confined spaces or at heights. Hazards include injury from falls or falling objects. Ironworkers (structural / ornamental) typically work a 40-hour week; however, inclement weather such as rain, snow or high winds may shut down projects for extended periods and deadlines and priorities may involve overtime.

They are required to have good mechanical aptitude, the ability to lift heavy objects, the ability to maintain balance working at heights in varying extreme climates, a thorough knowledge of the principles of lifting, rigging and hoisting, and a familiarity with a variety of metal fastening and joining methods. They are all required to be competent in the use and care of a variety of hand and power tools and equipment such as wrenches, pry bars, torches, levelling and welding equipment. They also use crane charts and must be able to estimate and reconcile crane ability with load sizes.

Because of the nature of the work, a primary concern of ironworkers (structural/ornamental) is workplace safety; therefore ironworkers (structural/ornamental) must be thoroughly familiar with the applicable sections of local, provincial and federal building and safety standards.

Ironworkers (Structural/Ornamental) tend to work in teams and team coordination is a large component of the occupation especially when hoisting and placing large, heavy components high above the ground.

Ironworkers (Structural/Ornamental) interact and work cooperatively with a wide variety of construction tradespeople such as ironworkers (reinforcing), crane operators, welders, carpenters, metal fabricators and millwrights.

# OCCUPATIONAL OBSERVATIONS

Technology continues to contribute to many changes in equipment design and construction materials. These innovations require constantly changing methods and techniques governed by appropriate attitudes towards the current high standards for fabrication, erection and installation of structural and ornamental components. Maintaining updated knowledge of these changes presents a daily challenge to the people of this trade.

The work of an ironworker (structural/ornamental), by its nature, possesses inherent hazards. Safe work procedures, best practices and job hazard analysis assist in controlling or eliminating hazards. However, errors in judgment or in practical application of trade knowledge can be costly, both in terms of injury to workers and damage to equipment or materials. Workers must maintain constant attention to the application of safety and accident prevention at all times.

Personal protective equipment such as fall arrest equipment, aerial work platforms, breathing apparatus and fume extraction equipment have become an integral part of all worksites and places of employment.

Ironworkers (Structural/Ornamental) are increasingly being called on to document and maintain records due to more stringent laws and regulations. The end products in industrial and other applications must be appropriately installed, inspected and documented. This places more responsibility on supervisors, quality control personnel and the individuals who perform the installation and assembly of components. The tremendous variety in equipment and methods means that the ironworker (structural/ornamental) must be more knowledgeable and adaptable than ever before.

**Trends**

There is greater emphasis on training and retraining of ironworkers (structural/ornamental). There is also a greater awareness of safety and safer working conditions and an increased emphasis on job coordination and scheduling. Also, there have been significant changes in the engineering and technology of ironworker (structural/ornamental) tools and equipment such as laser levels and electronic measuring instruments. Elevated work platforms are increasingly being used.

## Task 1 Interprets occupational documentation.

**Related Components (including, but not limited to)**

Drawings (structural, architectural, mechanical, engineering, detail and layout), codes (American National Standards Institute [ANSI], Canadian Standards Association [CSA], Concrete Reinforcing Steel Institute [CRSI], and Workplace Hazardous Materials Information System [WHMIS]), specifications, shipping documentation, manufacturers' manuals and occupational health and safety (OH&S) legislation.

**Tools and Equipment**

Architectural scales, calculator, measuring tape.

**Sub-task**

**A-1.01 Interprets drawings and specifications.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-1.01.01 | knowledge of types of drawings such as structural erection, architectural, precast shop and fabrication |
| A-1.01.02 | knowledge of welding symbols |
| A-1.01.03 | knowledge of abbreviations and technical vocabulary |
| A-1.01.04 | knowledge of drafting techniques |
| A-1.01.05 | ability to interpret drawing symbols |

| | |
|---|---|
| A-1.01.06 | ability to correlate types of drawings such as structural drawings, architectural drawings, engineering drawings, detail drawings and erection drawings |
| A-1.01.07 | ability to distinguish types of views |
| A-1.01.08 | ability to relate drawings to worksite |

---

**Sub-task**

**A-1.02 Interprets standards, regulations and procedures.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-1.02.01 | knowledge of standards such as CSA, ANSI and CRSI |
| A-1.02.02 | knowledge of regulations such as OH&S Act, WHMIS, fall protection and confined space awareness |
| A-1.02.03 | knowledge of the location of standards, regulations and procedures |
| A-1.02.04 | ability to apply procedures such as assembly, placing, tensioning and grouting |

## Task 2 — Communicates in the workplace.

| | |
|---|---|
| **Related Components (including, but not limited to)** | Manufacturers' documentation, manuals, record books. |
| **Tools and Equipment** | Communication devices (fax, cellular phone, telephone, photocopier, computer, radio, cameras, headsets, two-way radios, printers), flags. |

**Sub-task**

**A-2.01** **Communicates with co-workers.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-2.01.01 | knowledge of types of communication |
| A-2.01.02 | knowledge of interpersonal communication techniques |
| A-2.01.03 | knowledge of trade vocabulary |
| A.2.01.04 | knowledge of barriers to communication |
| A.2.01.05 | ability to write clearly and concisely |
| A.2.01.06 | ability to actively listen |
| A.2.01.07 | ability to check to confirm understanding |

**Sub-task**

**A-2.02** **Communicates with other disciplines.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-2.02.01 | knowledge of job-related terminology |
| A-2.02.02 | knowledge of report formats |
| A-2.02.03 | ability to actively listen |
| A-2.02.04 | ability to translate technical terms into layperson language |

| | |
|---|---|
| A-2.02.05 | ability to address others' concerns |
| A-2.02.06 | ability to write reports in prescribed formats |
| A-2.02.07 | ability to check to confirm understanding |

---

**Sub-task**

**A-2.03** **Communicates with apprentices.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-2.03.01 | knowledge of capability of apprentice |
| A-2.03.02 | ability to listen, teach, coach and mentor |
| A-2.03.03 | ability to supervise |
| A-2.03.04 | ability to assess and record ongoing progress |

---

**Sub-task**

**A-2.04** **Uses hand signals.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-2.04.01 | knowledge of types of signals |
| A-2.04.02 | knowledge of hand signals |
| A-2.04.03 | knowledge of signal terminology |
| A-2.04.04 | ability to select types of signals |
| A-2.04.05 | ability to interpret signals |
| A-2.04.06 | ability to select signals for type of equipment |

**Sub-task**

**A-2.05** **Communicates electronically.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-2.05.01 | knowledge of types of electronic communication devices such as cellular telephones, two-way radios and lap-top computers |
| A-2.05.02 | knowledge of communication protocols and company reporting policies |
| A-2.05.03 | ability to operate electronic communication devices |
| A-2.05.04 | ability to send, receive and retrieve information from computers |
| A-2.05.05 | ability to communicate through two-way radios and cellular phones |

## Task 3 Uses and maintains tools and equipment.

**Related Components (including, but not limited to)** Manufacturers' manuals, cleaning supplies, lubricating supplies.

**Tools and Equipment** See Appendix A.

**Sub-task**

**A-3.01** **Uses hand tools.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-3.01.01 | knowledge of types and uses of hand tools |
| A-3.01.02 | knowledge of hand tool safety |
| A-3.01.03 | knowledge of manufacturers' specifications on the use and care of hand tools |
| A.3.01.04 | knowledge of types of measuring equipment |

| | |
|---|---|
| A.3.01.05 | ability to select hand tools required for a task |
| A.3.01.06 | ability to identify damaged, worn or otherwise unsafe hand tools |
| A.3.01.07 | ability to clean and store hand tools |
| A.3.01.08 | ability to maintain hand tools |

---

**Sub-task**

**A-3.02** **Uses power tools.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-3.02.01 | knowledge of types and uses of power tools such as pneumatic, electric, gas powered and hydraulic |
| A-3.02.02 | knowledge of power tool components |
| A-3.02.03 | knowledge of operating procedures for power tools |
| A-3.02.04 | knowledge of power tool safety |
| A-3.02.05 | knowledge of manufacturers' recommended uses, limitations and maintenance of power tools |
| A-3.02.06 | ability to select power tools required for a task |
| A-3.02.07 | ability to identify damaged, worn or otherwise unsafe power tools |
| A-3.02.08 | ability to clean and store power tools |
| A-3.02.09 | ability to maintain power tools |

---

**Sub-task**

**A-3.03** **Uses powder-actuated tools.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-3.03.01 | knowledge of types and uses of powder-actuated tools |
| A-3.03.02 | knowledge of powder-actuated tool components |
| A-3.03.03 | knowledge of operating procedures for powder-actuated tools |
| A-3.03.04 | knowledge of powder-actuated tool safety |

| | |
|---|---|
| A-3.03.05 | knowledge of manufacturers' recommended uses and limitations |
| A-3.03.06 | knowledge of licensing or training requirements prior to the use of powder-actuated tools |
| A-3.03.07 | ability to select powder-actuated charges and fasteners required for a task |
| A-3.03.08 | ability to identify damaged, worn or otherwise unsafe powder-actuated tools |
| A-3.03.09 | ability to clean and lubricate powder-actuated tools |
| A-3.03.10 | ability to store powder-actuated tools |

---

**Sub-task**

**A-3.04** **Uses aerial work platforms.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-3.04.01 | knowledge of types and uses of aerial work platforms |
| A-3.04.02 | knowledge of aerial work platform safety |
| A-3.04.03 | knowledge of aerial work platform regulations and certification requirements |
| A-3.04.04 | knowledge of aerial work platform components and accessories |
| A-3.04.05 | knowledge of operating procedures of aerial work platforms |
| A-3.04.06 | knowledge of manufacturers' specifications for use of aerial work platforms |
| A-3.04.07 | ability to identify damaged, worn or otherwise unsafe aerial work platforms and equipment |
| A-3.04.08 | ability to position aerial work platforms |
| A-3.04.09 | ability to store aerial work platforms |

---

**Sub-task**

**A-3.05** **Uses ladders.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-3.05.01 | knowledge of types and uses of ladders |
| A-3.05.02 | knowledge of safe operating procedures for ladders |

| | |
|---|---|
| A-3.05.03 | knowledge of manufacturers' specifications for use and care of ladders |
| A-3.05.04 | ability to position ladders |
| A-3.05.05 | ability to secure ladders |
| A-3.05.06 | ability to dismantle and store ladders |
| A-3.05.07 | ability to identify worn, damaged or otherwise unsafe ladders |

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**Sub-task**

**A-3.06** **Uses scaffolding.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-3.06.01 | knowledge of regulations pertaining to scaffolding |
| A-3.06.02 | knowledge of types of scaffolding |
| A-3.06.03 | knowledge of installation and dismantling procedures |
| A-3.06.04 | knowledge of manufacturers' recommended uses and limitations of scaffolding |
| A-3.06.05 | ability to position and erect scaffolding and install planking, guardrails and toe plates |
| A-3.06.06 | ability to secure scaffolding, planking, guardrails, toe plates and related components |
| A-3.06.07 | ability to dismantle and store scaffolding |
| A-3.06.08 | ability to identify damaged, worn or otherwise unsafe scaffolding and planking |

---

**Sub-task**

**A-3.07** **Uses personal protective equipment (PPE).**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-3.07.01 | knowledge of types and uses of PPE such as hard hats, safety glasses, hearing protection, welding PPE, safety footwear and fall arrest equipment |
| A-3.07.02 | knowledge of PPE safety |

| | |
|---|---|
| A-3.07.03 | knowledge of manufacturers' recommended uses, limitations and maintenance of PPE |
| A-3.07.04 | knowledge of workplace rules and regulations |
| A-3.07.05 | ability to select PPE for conditions encountered |
| A-3.07.06 | ability to use fall arrest equipment such as harnesses, safety belts and lines |
| A-3.07.07 | ability to identify damaged, worn or otherwise unsafe PPE |
| A-3.07.08 | ability to store PPE |

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**Sub-task**

**A-3.08** **Uses surveying equipment.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-3.08.01 | knowledge of types of layout instruments such as theodolite, transit, scales and laser level |
| A-3.08.02 | knowledge of measurement techniques |
| A-3.08.03 | knowledge of blueprint interpretation |
| A-3.08.04 | knowledge of marking techniques |
| A-3.08.05 | ability to select equipment for a task |
| A-3.08.06 | ability to calculate angles and distances |
| A-3.08.07 | ability to transfer blueprint information to site |
| A-3.08.08 | ability to set up and calibrate equipment |
| A-3.08.09 | ability to store surveying equipment |

---

**Sub-task**

**A-3.09** **Uses welding equipment.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-3.09.01 | knowledge of provincial/territorial and applicable welding regulations |
| A-3.09.02 | knowledge of Canadian Welding Bureau (CWB) standards |

| | |
|---|---|
| A-3.09.03 | knowledge of welding processes and procedures |
| A-3.09.04 | knowledge of welding symbols |
| A-3.09.05 | knowledge of welding hazards |
| A-3.09.06 | knowledge of welding equipment |
| A-3.09.07 | knowledge of welding consumables |
| A-3.09.08 | knowledge of welding defects |
| A-3.09.09 | ability to set up welding equipment |
| A-3.09.10 | ability to perform welding processes |
| A-3.09.11 | ability to adjust welding parameters to suit site conditions |
| A-3.09.12 | ability to identify damaged, worn or otherwise unsafe welding equipment |
| A-3.09.13 | ability to store welding equipment |

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**Sub-task**

**A-3.10 Uses thermal and oxy-fuel cutting equipment.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-3.10.01 | knowledge of cutting processes |
| A-3.10.02 | knowledge of cutting equipment |
| A-3.10.03 | knowledge of cutting consumables |
| A-3.10.04 | ability to set up equipment |
| A-3.10.05 | ability to inspect equipment |
| A-3.10.06 | ability to adjust cutting parameters |
| A-3.10.07 | ability to recognize cutting hazards |
| A-3.10.08 | ability to identify damaged, worn or otherwise unsafe cutting equipment |
| A-3.10.09 | ability to store cutting equipment and consumables |

## Task 4 — Organizes work.

| | |
|---|---|
| **Related Components (including, but not limited to)** | Company standards, safety manuals, company policies, procedures and regulations, schedules/calendars, drawings, specifications. |
| **Tools and Equipment** | See Appendix A. |

**Sub-task**

**A-4.01 Organizes materials and supplies.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-4.01.01 | knowledge of erection sequence |
| A-4.01.02 | knowledge of equipment capabilities and limitations |
| A-4.01.03 | knowledge of site preparation |
| A-4.01.04 | knowledge of shipping documentation |
| A-4.01.05 | knowledge of storage principles |
| A-4.01.06 | ability to schedule material and supplies required for job |
| A-4.01.07 | ability to unload equipment |
| A-4.01.08 | ability to place and sort materials and supplies |
| A-4.01.09 | ability to reconcile load with shipping documents |
| A-4.01.10 | ability to secure equipment and materials |

**Sub-task**

**A-4.02** **Marks layouts.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-4.02.01 | knowledge of drawings |
| A-4.02.02 | ability to interpret drawings |
| A-4.02.03 | ability to use measuring devices and layout tools |
| A-4.02.04 | ability to apply marking and layout techniques |
| A-4.02.05 | ability to visualize finished product |
| A-4.02.06 | ability to transfer drawing information to accommodate site conditions |

**Sub-task**

**A-4.03** **Maintains safe work environment.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-4.03.01 | knowledge of safety regulations |
| A-4.03.02 | knowledge of building codes |
| A-4.03.03 | knowledge of applications of safety equipment such as fall arrest, fall restraint and work positioning |
| A-4.03.04 | knowledge of safe work practices and limitations |
| A-4.03.05 | ability to apply safety standards applicable to workplace |
| A-4.03.06 | ability to install safety equipment such as guard rails, static lines, lifelines, screens, temporary flooring, warning signs and barriers |
| A-4.03.07 | ability to maintain good housekeeping |

**Sub-task**

**A-4.04** **Assesses site hazards.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-4.04.01 | knowledge of policies and procedures |
| A-4.04.02 | knowledge of codes and procedures |
| A-4.04.03 | ability to recognize hazards such as floor openings, leading edges and obstructions |
| A-4.04.04 | ability to control hazards |

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**Sub-task**

**A-4.05** **Plans work tasks.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| A-4.05.01 | knowledge of specifications and drawings |
| A-4.05.02 | ability to interpret specifications and drawings |
| A-4.05.03 | ability to improvise to suit site conditions |
| A-4.05.04 | ability to maintain schedule |
| A-4.05.05 | ability to select materials and supplies required for task |
| A-4.05.06 | ability to select equipment and tools required for task |

**Trends**

The occupation has seen an increase in the development and deployment of new technologies such as specialty rigging and the use of synthetic materials. The occupation has seen the increased presence of comprehensive regulations, especially in regard to the use of heavy mobile equipment.

## Task 5 Selects rigging equipment.

**Related Components (including, but not limited to)**

Chokers, slings, chains, hooks, shackles, thimbles, guys, clips, wire rope, spreader bar, balance beam, equalizer beam, blocks, fibre rope, cable puller, softener, charts.

**Tools and Equipment**

Hand tools, standard tools, PPE, rope and cable tugger, calculator, vernier calipers, marlinspike.

**Sub-task**

**B-5.01 Matches load to lift capability.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| B-5.01.01 | knowledge of types of lifting equipment such as hydraulic jacks, fork lifts, air pallets, pallet jacks and rollers |
| B-5.01.02 | knowledge of the capacity of lifting equipment |
| B-5.01.03 | knowledge of basic geometry |
| B-5.01.04 | knowledge of weights and measures |
| B-5.01.05 | ability to calculate weights of loads |
| B-5.01.06 | ability to select rigging equipment |
| B-5.01.07 | ability to calculate choker tension based on choker angle and load |

**Sub-task**

**B-5.02** **Inspects rigging equipment.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| B-5.02.01 | knowledge of types of rigging equipment |
| B-5.02.02 | knowledge of manufacturers' specifications |
| B-5.02.03 | knowledge of policies and procedures |
| B-5.02.04 | knowledge of tools and materials |
| B-5.02.05 | ability to identify defects |
| B-5.02.06 | ability to report defects |

**Sub-task**

**B-5.03** **Maintains rigging equipment.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| B-5.03.01 | knowledge of types of rigging equipment |
| B-5.03.02 | knowledge of manufacturers' specifications |
| B-5.03.03 | knowledge of policies and procedures |
| B-5.03.04 | knowledge of tools and materials |
| B-5.03.05 | ability to perform maintenance procedures |
| B-5.03.06 | ability to store rigging equipment |

## Task 6 — Uses hoisting and lifting equipment.

| | |
|---|---|
| **Related Components (including, but not limited to)** | Structural members, conveyors, machinery, curtain walls, platforms, pre-fabricated components. |
| **Tools and Equipment** | Hand tools, boom truck, zoom boom, come-alongs, hydraulic jacks, chain block hoist, tugger, fork lift, rollers, air pallets, bents, form boom, dunnage, derricks, strand jack system, carry deck. |

**Sub-task**

**B-6.01 Uses hoisting equipment.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| B-6.01.01 | knowledge of provincial/territorial and applicable regulations and certification requirements |
| B-6.01.02 | knowledge of types of hoisting equipment such as come-alongs, tirfors, chain block hoists, tuggers and derricks |
| B-6.01.03 | knowledge of anchorage locations and capabilities |
| B-6.01.04 | knowledge of policies and procedures |
| B-6.01.05 | ability to select hoisting equipment |
| B-6.01.06 | ability to select anchorage locations |
| B-6.01.07 | ability to follow manufacturers' specifications |

**Sub-task**

**B-6.02** **Uses lifting equipment.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| B-6.02.01 | knowledge of types of lifting equipment such as hydraulic jacks, fork lifts and air pallets |
| B-6.02.02 | knowledge of policies and procedures |
| B-6.02.03 | ability to select lifting equipment |
| B-6.02.04 | ability to follow manufacturers' specifications and recommendations |

**Sub-task**

**B-6.03** **Attaches rigging to load.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| B-6.03.01 | knowledge of hoisting procedures such as engineer's plan, multi-member and tandem lift |
| B-6.03.02 | knowledge of placement and attachment location |
| B-6.03.03 | knowledge of hoisting specifications |
| B-6.03.04 | ability to select lifting procedures |
| B-6.03.05 | ability to use and tie knots, bends and hitches |
| B-6.03.06 | ability to follow rigging procedures |
| B-6.03.07 | ability to use rigging equipment |

**Trends**

Modern cranes have greater lifting capacity and are more precise in the positioning of their loads, often within millimetres of specifications. The erection of cranes has also become more automatic, with modern cranes greatly assisting in their own erection.

## Task 7 Assembles and erects cranes.

**Related Components (including, but not limited to)**

Mats, pads, dunnage, boom sections and jib, counterweight, pins and cotter pins, bolts, blocks and sheaves, headache ball, hook, wedge socket bridle, mast, outriggers, gantry, cable components (pendant lines, jib lines, guide lines, load lines).

**Tools and Equipment**

Sledge hammer, back-out hammer (B & O hammer), wrenches, pry bars, rigging hardware, PPE, pliers, assist cranes, hand tools, types of cranes (rough terrain cranes, all terrain, crawler, hydraulic, tower, boom, electric overhead travelling [EOT], heavy lift, gantries, knuckle boom), specialty heavy lift components.

Also see Appendix A.

**Sub-task**

**C-7.01 Assesses site hazards.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| C-7.01.01 | knowledge of types of hazards such as overhead power lines, underground services, ground conditions, other workers and obstructions to swing radius |
| C-7.01.02 | knowledge of swing area (radius) of crane |
| C-7.01.03 | ability to calculate crane radius |
| C-7.01.04 | ability to identify potential hazards |
| C-7.01.05 | ability to read load charts |

**Sub-task**

**C-7.02** **Determines crane position.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| C-7.02.01 | knowledge of crane types |
| C-7.02.02 | knowledge of crane capacity |
| C-7.02.03 | knowledge of crane radius |
| C-7.02.04 | knowledge of maximum weight of lifts |
| C-7.02.05 | knowledge of crane limitations due to inclement weather |
| C-7.02.06 | ability to determine weights of components |
| C-7.02.07 | ability to calculate the available headroom |
| C-7.02.08 | ability to select crane for required task |
| C-7.02.09 | ability to minimize overhead dangers |

**Sub-task**

**C-7.03** **Prepares bases.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| C-7.03.01 | knowledge of gross weight of crane |
| C-7.03.02 | knowledge of composition of base such as soil, concrete and steel |
| C-7.03.03 | knowledge of types of pads |
| C-7.03.04 | ability to select pads such as mats, dunnage and cribbing |
| C-7.03.05 | ability to visually assess ground conditions |
| C-7.03.06 | ability to ensure ground is stable and level |
| C-7.03.07 | ability to install falsework |

**Sub-task**

**C-7.04** **Erects cranes.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| C-7.04.01 | knowledge of sequence of assembly |
| C-7.04.02 | knowledge of crane components such as boom sections, counterweights and jibs |
| C-7.04.03 | knowledge of crane signals |
| C-7.04.04 | knowledge of tools used in erection of cranes |
| C-7.04.05 | knowledge of safe rigging practices |
| C-7.04.06 | ability to ensure adequate space for assembly |
| C-7.04.07 | ability to install components |
| C-7.04.08 | ability to reeve/lace blocks |
| C-7.04.09 | ability to participate in engineered (critical) lifts |
| C-7.04.10 | ability to finalize set-up |

## Task 8 Disassembles cranes.

| | |
|---|---|
| **Related Components (including, but not limited to)** | Falsework, mats, pads, dunnage, boom sections and jib, counterweight, pins and cotter pins, bolts, blocks and sheaves, drums and tracks, headache ball, hook, wedge socket bridle, mast, outriggers, gantries, rail tracks, cable components (pendant lines, jib lines, guide lines, load lines). |
| **Tools and Equipment** | Sledge hammer, B & O hammer, wrenches, pry bars, rigging hardware, jacks and rollers, pliers, PPE, assist cranes (rough terrain, all terrain, crawler, hydraulic, tower, EOT, gantries, knuckle boom). |

**Sub-task**

**C-8.01 Disassembles crane components.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| C-8.01.01 | knowledge of method of disassembly |
| C-8.01.02 | knowledge of sequence of disassembly |
| C-8.01.03 | knowledge of equipment and tools required for task |
| C-8.01.04 | knowledge of rigging |
| C-8.01.05 | ability to recognize hazards of disassembly such as tensioned pins and overloads |
| C-8.01.06 | ability to disconnect components |
| C-8.01.07 | ability to direct crane operator |
| C-8.01.08 | ability to rig crane components |
| C-8.01.09 | ability to block boom sections |

**Sub-task**

**C-8.02** **Prepares crane for transport.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| C-8.02.01 | knowledge of safe rigging practices |
| C-8.02.02 | ability to select type of rigging |
| C-8.02.03 | ability to place and secure components on transportation deck |

## BLOCK D — ERECTION, ASSEMBLY AND INSTALLATION

**Trends**

The occupation has seen steady advancements in the development of safer work environments. Pre-assembled, modular and composite components are becoming common in the occupation. Hi-tech machine movers with greater precision are also a factor in the changes taking place within the occupation.

### Task 9 — Installs primary and secondary structural members.

**Related Components (including, but not limited to)**

Steel members (I and H beams, angles, channels, trusses, tees, columns, girts, joists, Hollow Structural Sections [HSS] tubing, decking [Q]), precast members (panels, beams, columns, single tees , twin tees, AASHTO beams and joists), glue-lam beams, composite members.

**Tools and Equipment**

Cables, connectors, sledge hammer, turnbuckles, wire rope, surveying instruments, impact gun, pins (drift, bull), welding machine, clip wrench, rigging hardware, spud wrench, sleever bars, torch, cable clips, plumb bob, come-along, reamer, wedges and jacks, chain fall, clamps, scaffolding, thimble.

**Sub-task**

**D-9.01** **Erects falsework.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| D-9.01.01 | knowledge of types and applications of falsework |
| D-9.01.02 | knowledge of supports and bracing |
| D-9.01.03 | ability to determine need for falsework |
| D-9.01.04 | ability to determine location of falsework |

| | |
|---|---|
| D-9.01.05 | ability to lay out and construct falsework |
| D-9.01.06 | ability to place and secure falsework |

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**Sub-task**

**D-9.02 Attaches structural members.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| D-9.02.01 | knowledge of types of structural members |
| D-9.02.02 | knowledge of crane signals |
| D-9.02.03 | knowledge of types of bolts and pins |
| D-9.02.04 | knowledge of installation techniques and methods |
| D-9.02.05 | knowledge of tools and equipment capabilities |
| D-9.02.06 | ability to manoeuvre at heights |
| D-9.02.07 | ability to fit, place and modify members |
| D-9.02.08 | ability to determine minimal amount of fasteners to secure load |

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**Sub-task**

**D-9.03 Levels, plumbs and aligns structural members.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| D-9.03.01 | knowledge of plumbing and alignment equipment such as cables and surveying equipment |
| D-9.03.02 | knowledge of plumbing and aligning techniques and tolerances |
| D-9.03.03 | knowledge of temporary bracing techniques |
| D-9.03.04 | ability to attach tools and equipment such as cables, jacks and temporary bracing |
| D-9.03.05 | ability to set up and use surveying equipment such as levels, plumb bobs, transits and laser levels |

| | |
|---|---|
| D-9.03.06 | ability to determine direction of pull or push |
| D-9.03.07 | ability to place shims to the desired elevation |

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**Sub-task**

**D-9.04 Completes installation of structural members.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| D-9.04.01 | knowledge of welding, fitting and torque procedures and practices |
| D-9.04.02 | knowledge of installation of fasteners |
| D-9.04.03 | knowledge of specifications and tolerances such as for welding and torque |
| D-9.04.04 | ability to torque bolts |
| D-9.04.05 | ability to align holes using equipment such as pins, bars and reamers |
| D-9.04.06 | ability to fabricate connections in place |
| D-9.04.07 | ability to select fasteners |
| D-9.04.08 | ability to fit and weld members |

## Task 10 — Installs ornamental components and systems.

**Related Components (including, but not limited to)**

Steel members (I and H beams, angles, channels, trusses, tees, columns, girts, joists, HSS tubing, decking [QI], precast members (panels, beams, columns, single and double tee, joists), composite members, windows, precast concrete sections, curtain walls, masonry support lintels, seismic reinforcement supports, stairs (structural and ornamental), hand rails, finishing products such as stainless steel, brass or aluminium coverings (non-ferrous metals), fibre reinforced polymers (FRP), architectural products (ladders, stairs, grating flooring, railings, miscellaneous iron products).

**Tools and Equipment**

Hand tools, cables, connectors, turnbuckles, wire rope, surveying instruments, impact gun, pins (drift, bull), welding machine, clip wrench, rigging hardware, spud wrench, sleever bars, torch, cable clips, plumb bob, come-along, reamer, wedges and jacks, chain fall, clamps, scaffolding, squares, ratchet set, level, tap and dies, grinder, rivet gun, caulking, sealant, shims.

---

**Sub-task**

**D-10.01 Installs curtain walls.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | no | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| D-10.01.01 | knowledge of types of curtain walls |
| D-10.01.02 | knowledge of curtain wall installation procedures |
| D-10.01.03 | knowledge of sealants |
| D-10.01.04 | knowledge of layout procedures |
| D-10.01.05 | knowledge of glazing techniques |
| D-10.01.06 | ability to establish benchmarks and control lines |
| D-10.01.07 | ability to work at heights from various types of lifts such as swing stages and aerial work platforms |
| D-10.01.08 | ability to apply sealants |
| D-10.01.09 | ability to install as per specifications |

**Sub-task**

**D-10.02 Installs miscellaneous components.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| D-10.02.01 | knowledge of types of miscellaneous components such as stairs, railings and coverings |
| D-10.02.02 | knowledge of miscellaneous component installation procedures |
| D-10.02.03 | ability to determine installation sequence such as sub-assembly and order of installation |
| D-10.02.04 | ability to fit, weld and finish a variety of materials |
| D-10.02.05 | ability to set up rigging |
| D-10.02.06 | ability to field-fabricate and modify components |
| D-10.02.07 | ability to follow manufacturers' specifications |
| D-10.02.08 | ability to finish installation such as polishing and painting |

## Task 11 — Installs conveyors, machinery and equipment.

| | |
|---|---|
| **Related Components (including, but not limited to)** | Crushers, conveyors, ball mills, guards, rollers, hydraulic gantries, jacking towers, multi-bearing rollers, belts, platework, bearings, pillow block, trunions, hangers, rails, chains, floats, supports, headers, take-ups, chutes, vessels, hoppers, tanks, bins, lubricants. |
| **Tools and Equipment** | Multi-roller, hydraulic jacks, track jacks, pry bar, rolling hardware and equipment such as chain-falls, come-alongs, slings, air cushions, shackles, softeners, welding equipment, winches, blocks, rope, surveying equipment, cable tugger, key plates, hammers, forklift, carry deck, strong back, clamps, dogs. |

**Sub-task**

**D-11.01** **Installs material handling systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| D-11.01.01 | knowledge of types of material handling systems and components |
| D-11.01.02 | knowledge of material handling installation procedures |
| D-11.01.03 | ability to assemble components |
| D-11.01.04 | ability to sequence installation of various components such as supports, headers and rails |
| D-11.01.05 | ability to establish work points with surveying equipment |

**Sub-task**

**D-11.02** **Aligns material handling systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| D-11.02.01 | knowledge of specifications and tolerances |
| D-11.02.02 | knowledge of welding and cutting techniques |

| | |
|---|---|
| D-11.02.03 | knowledge of methods of alignment |
| D-11.02.04 | ability to determine tolerances from drawings to verify locations |
| D-11.02.05 | ability to use precision tools and measuring instruments such as verniers, micrometers and feeler gauges |
| D-11.02.06 | ability to transfer benchmarks and control lines |
| D-11.02.07 | ability to rig and jack components to specifications |
| D-11.02.08 | ability to troubleshoot for defects and malfunctions |
| D-11.02.09 | ability to secure components |

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**Sub-task**

**D-11.03 Places machinery and equipment.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| D-11.03.01 | knowledge of types of machinery and equipment |
| D-11.03.02 | knowledge of machinery installation procedures |
| D-11.03.03 | knowledge of specifications and tolerances |
| D-11.03.04 | ability to determine weights of machines and components |
| D-11.03.05 | ability to assemble components of machinery |
| D-11.03.06 | ability to insert shims and use adjusting screws for setting and levelling |
| D-11.03.07 | ability to assess best travel path |
| D-11.03.08 | ability to transfer loads to various floats and rollers |
| D-11.03.09 | ability to determine centre of gravity |
| D-11.03.10 | ability to use precision instruments to set machines |

## BLOCK E MAINTENANCE AND UPGRADING

**Trends**

The occupation has seen an increased awareness for the need to develop and implement new recycling techniques. The occupation continues to promote safe working conditions by raising the level of awareness of environmental hazards such as asbestos and silicone.

### Task 12 Repairs components.

**Related Components (including, but not limited to)**

Steel and FRP structural shapes, concrete such as pre-stressed and post-tensioned, plates, non-ferrous metals, conveyor components, sealant, fasteners, welding products.

**Tools and Equipment**

Architectural scales, calculator, hand tools, power tools, rigging equipment, welding equipment, safety equipment, PPE.

**Sub-task**

**E-12.01 Assesses current condition of components.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

E-12.01.01 knowledge of manufacturers' specifications

E-12.01.02 knowledge of policies and procedures

E-12.01.03 ability to confirm components meet specifications

E-12.01.04 ability to communicate observed defects

E-12.01.05 ability to use diagnostic tools such as calipers and torque wrenches

**Sub-task**

**E-12.02 Field-fabricates components.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| E-12.02.01 | knowledge of layout techniques |
| E-12.02.02 | knowledge of manufacturers' specifications |
| E-12.02.03 | knowledge of policies and procedures |
| E-12.02.04 | ability to fit components |

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**Sub-task**

**E-12.03 Replaces components.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| E-12.03.01 | knowledge of policies and regulations |
| E-12.03.02 | knowledge of removal techniques |
| E-12.03.03 | knowledge of installation techniques |
| E-12.03.04 | knowledge of temporary support techniques |
| E-12.03.05 | ability to remove defective components |
| E-12.03.06 | ability to install replacement components |
| E-12.03.07 | ability to verify conditions of repair |

**Sub-task**

**E-12.04 Performs preventative maintenance.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| E-12.04.01 | knowledge of manufacturers' specifications |
| E-12.04.02 | knowledge of policies and procedures |
| E-12.04.03 | knowledge of materials used such as reinforcing, lubrication and hard surfacing |
| E-12.04.04 | knowledge of maintenance logs and schedules |
| E-12.04.05 | knowledge of maintenance techniques |
| E-12.04.06 | ability to interpret maintenance schedules |
| E-12.04.07 | ability to perform maintenance techniques such as reinforcing, lubrication and hard surfacing |

## Task 13 — Dismantles and removes structural, mechanical and miscellaneous components.

| | |
|---|---|
| **Related Components (including, but not limited to)** | Steel and structural shapes, concrete such as pre-stressed and post-tensioned, plates, non-ferrous metals, conveyor components, sealant, fasteners, welding products. |
| **Tools and Equipment** | Architectural scales, calculator, hand tools, power tools, rigging equipment, welding equipment, safety equipment, PPE. |

**Sub-task**

**E-13.01** **Ensures decommissioning of structure or components.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| E-13.01.01 | knowledge of policies and procedures such as lock-out, tagging procedures, hot work procedures and WHMIS |
| E-13.01.02 | knowledge of sequence of decommissioning |
| E-13.01.03 | ability to review decommissioning documentation and keep records |

**Sub-task**

**E-13.02** **Plans sequence of disassembly.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| E-13.02.01 | knowledge of disassembly sequence |
| E-13.02.02 | knowledge of disassembly techniques |
| E-13.02.03 | knowledge of temporary support techniques |
| E-13.02.04 | ability to determine and prioritize required tasks |

**Sub-task**

**C-13.03** **Removes components.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| yes | yes | yes | ND | ND | yes | ND | yes | yes | yes | ND | ND | ND |

**Supporting Knowledge and Abilities**

| | |
|---|---|
| C-13.03.01 | knowledge of sequence of tasks |
| C-13.03.02 | knowledge of storage and placement of components |
| C-13.03.03 | ability to follow sequence of disassembly |
| C-13.03.04 | ability to calculate loads and choker tension |

# APPENDICES

# APPENDIX A — TOOLS AND EQUIPMENT

## Hand Tools

adjustable wrench
aligning bar (sleever bar)
Allen key set
bar clamps
beam clamps
bolt bag
bolt cutters
button pump
cable cutters
centre punch
chalk line
chipping hammer
cold chisel
combination square
combination wrench set
drill bits
files
finger clamps
flashlight
hack saw
hammers
hickey bar
knives
knocker wrench
marlinspike
needle nose pliers
nut drivers
pins (drift, bull)
pipe cutters
pipe wrench
pliers
prybar
punch
reamers
reel holder
rod bag
scrapers
screwdrivers — Robertson; Phillips, flat blades
side/diagonal cutters
sledge hammer
slip joint pliers
socket set
spud wrench
tap set
tie wire reel
tin snips
tool belt
tool bucket
wire brush

## Safety Equipment

air movers (fans)
anchor points
cables
eye wash facilities
fire blankets
fire extinguishers
first aid equipment
fume and toxic gas detector
guard rails
life lines
perimeter cables
portable lighting
ropes (fibre, wire)
signage
stanchion posts
warning tape
welding flash screens

### Personal Protective Equipment (PPE)

breathable air pack
chin straps
coveralls (fire retardant)
ear plugs
face shields
fall arresters
full body harness
gloves
goggles
hard hat
insulated gloves
knee pads
lock-out kit
respirators
retractable lanyard
rope grabs
rubber gloves
safety belt
safety glasses
safety vest
steel toe boots
welding apron
welding gloves
welding helmet
welding jacket
welding shield

### Power Tools and Equipment

air chisel
band saw
chop saw
circular saw
compressor
disk
electric hacksaw
gas cut-off saw
gas deck saw
generator
grinder
hammer drill
hydraulic jacks (and accessories)
impact drill
impact gun
mag drill
peening tool
pencil grinder
percussion drill
porta band
powder actuated tool
power drill
reciprocating saw
rivet buster
riveting gun
tension control gun

### Measuring and Layout Equipment

bevel squares
builders level
chalk line
distometers
laser level
laser square
measuring chain
measuring tape
micrometers
optical levels
piano wire
plumb line
prism
rod level
scale
spirit levels
squares (framing, combination)
straight edges
string line

**Measuring and Layout Equipment (continued)**

theodolite
torpedo level
transit
tripods
Vernier
water level

**Specialty Tools and Equipment (Welding and Cutting Tools)**

arc air (gouger)
air lance
arc welding machine
chipping hammer
cutting tools (oxygen, acetylene, propane)
MIG welder
plasma cutter
radiograph
stud welding equipment
stud welding gun
submerged arc machine
thermal cutting machine
thermite welding machine
tiger torch

**Scaffolding and Access Equipment**

aerial work platforms
aluminium framed platform
aluminium planks
boom lifts
bosun chair
electrical articulated boom lift
electrical scissor lifts
electrical vertical lifts
end frames
extension ladder
floats (angel's wings)
gas powered articulated boom lift
gas powered scissor lifts
ladder jack scaffolds
ladders
mechanical scaffolds
ramps
rolling scaffolds
sawhorses
scissor-lift
stationary scaffolds
stepladders
swing stages
temporary access/freight elevator
tube and clamps

**Rigging Equipment**

beam clamps
binders
blocks
bridle hitch
cable clamps
chain
chain falls
come-alongs
dunnage
equalizer beam
eye bolts
fibre rope
hooks
mechanical/hydraulic jacks
multi-bearing rollers
multiple-leg bridle sling
ring and lines
rope clips
shackles
sheaves
simple roller
softeners

## Rigging Equipment (continued)

spreader beam
spreaders
swivel
synthetic slings
tackle blocks
thimbles
turnbuckles
wedge sockets
winches
wire rope
wire rope slings

## Handling Equipment

boom trucks
chain falls
come-alongs
cradle
forklifts (telescopic, electric, gas powered)
multi-bearing rollers
pallet jack
rollers
stretcher
tugger

# APPENDIX B GLOSSARY

| | |
|---|---|
| **accessories** | items used in conjunctions with reinforcing steel such as bar chairs, slab bolsters, etc. |
| **curtain wall** | an enclosing wall which provides no structural support |
| **dunnage** | wooden boards and timbers used to hold material in place when being transported |
| **falsework** | temporary steel or wooden supports upon which final steel is erected |
| **girts** | horizontal or vertical framing member to which sash, siding or other finished material is attached |
| **grating** | an arrangement of parallel or latticed bars which serve as the floor of a platform, walkway, etc. |
| **miscellaneous iron products** | any steel product or component that is not main structural supporting member |
| **ornamental components** | non-structural steel, precast or composite members |

# APPENDIX C

## ACRONYMS

| | |
|---|---|
| **AASHTO** | American Association of State Highway and Transportation Officials |
| **ANSI** | American National Standards Institute |
| **B & O hammer** | back-out hammer |
| **CRSI** | Concrete Reinforcing Steel Institute |
| **CSA** | Canadian Standards Association |
| **CWB** | Canadian Welding Bureau |
| **EOT crane** | electric overhead travelling crane |
| **FRP** | fibre reinforced polymer |
| **HSS** | Hollow Structural Sections |
| **OH&S** | Occupational Health and Safety |
| **PPE** | personal protective equipment |
| **WHMIS** | Workplace Hazardous Materials Information System |

# APPENDIX D — BLOCK AND TASK WEIGHTING

## BLOCK A OCCUPATIONAL SKILLS

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | National Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | 15 | 12 | 10 | ND | ND | 6 | ND | 5 | 20 | 15 | ND | ND | ND | 12% |

Task 1 Interprets occupational documentation.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | 28 | 35 | 15 | ND | ND | 10 | ND | 20 | 30 | 30 | ND | ND | ND | 24% |

Task 2 Communicates in the workplace.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | 21 | 10 | 15 | ND | ND | 5 | ND | 20 | 10 | 10 | ND | ND | ND | 13% |

Task 3 Uses and maintains tools and equipment.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | 29 | 25 | 35 | ND | ND | 50 | ND | 40 | 50 | 30 | ND | ND | ND | 37% |

Task 4 Organizes work.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | 22 | 30 | 35 | ND | ND | 35 | ND | 20 | 10 | 30 | ND | ND | ND | 26% |

## BLOCK B RIGGING AND HOISTING

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | National Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | 20 | 25 | 25 | ND | ND | 24 | ND | 30 | 20 | 25 | ND | ND | ND | 24% |

Task 5 Selects rigging equipment.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | 50 | 50 | 50 | ND | ND | 30 | ND | 60 | 50 | 50 | ND | ND | ND | 49% |

Task 6 Uses hoisting and lifting equipment.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | 50 | 50 | 50 | ND | ND | 70 | ND | 40 | 50 | 50 | ND | ND | ND | 51% |

**BLOCK C CRANES**

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | National Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | 20 | 15 | 15 | ND | ND | 18 | ND | 10 | 10 | 8 | ND | ND | ND | 14% |

Task 7 Assembles and erects cranes.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | 53 | 50 | 50 | ND | ND | 50 | ND | 65 | 65 | 50 | ND | ND | ND | 55% |

Task 8 Disassembles cranes.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | 47 | 50 | 50 | ND | ND | 50 | ND | 35 | 35 | 50 | ND | ND | ND | 45% |

**BLOCK D ERECTION, ASSEMBLY AND INSTALLATION**

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | National Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | 35 | 40 | 40 | ND | ND | 37 | ND | 45 | 40 | 45 | ND | ND | ND | 40% |

Task 9 Installs primary and secondary structural members.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | 44 | 50 | 25 | ND | ND | 40 | ND | 60 | 60 | 65 | ND | ND | ND | 49% |

Task 10 Installs ornamental components and systems.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | 27 | 25 | 60 | ND | ND | 30 | ND | 10 | 30 | 20 | ND | ND | ND | 29% |

Task 11 Installs conveyors, machinery and equipment.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | 29 | 25 | 15 | ND | ND | 30 | ND | 30 | 10 | 15 | ND | ND | ND | 22% |

## BLOCK E MAINTENANCE AND UPGRADING

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | National Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | 10 | 8 | 10 | ND | ND | 15 | ND | 10 | 10 | 7 | ND | ND | ND | 10% |

Task 12 Repairs components.

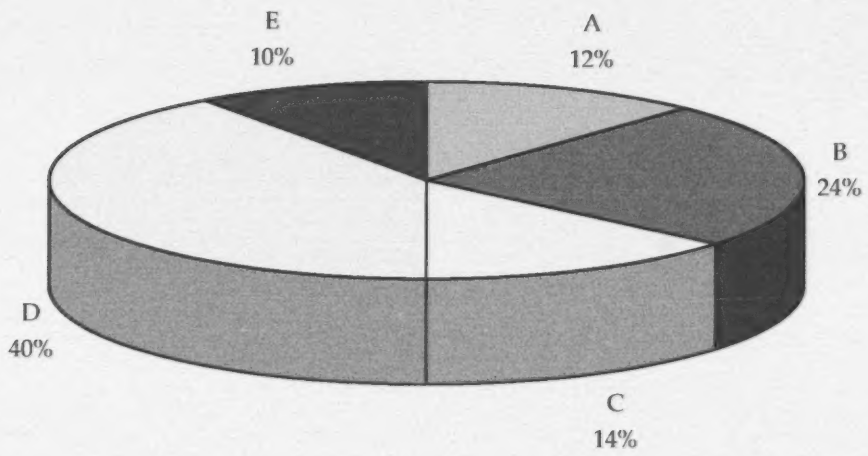
| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | 31 | 40 | 40 | ND | ND | 70 | ND | 40 | 50 | 50 | ND | ND | ND | 46% |

Task 13 Dismantles and removes structural, mechanical and miscellaneous components.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | 69 | 60 | 60 | ND | ND | 30 | ND | 60 | 50 | 50 | ND | ND | ND | 54% |

# APPENDIX E

## PIE CHART*




**TITLES OF BLOCKS**

| | | | |
|---|---|---|---|
| BLOCK A | Occupational Skills | BLOCK D | Erection, Assembly and Installation |
| BLOCK B | Rigging and Hoisting | BLOCK E | Maintenance and Upgrading |
| BLOCK C | Cranes | | |

*Average percentage of the total number of questions on an interprovincial examination, assigned to assess each block of the analysis, as derived from the collective input from workers within the occupation from all areas of Canada. Interprovincial examinations typically have from 100 to 150 multiple-choice questions.

# APPENDIX F

## TASK PROFILE CHART — Ironworker (Structural/Ornamental)

| BLOCKS | TASKS | SUB-TASKS | | | | |
|---|---|---|---|---|---|---|
| A - OCCUPATIONAL SKILLS | 1. Interprets occupational documentation. | 1.01 Interprets drawings and specifications. | 1.02 Interprets standards, regulations and procedures. | | | |
| | 2. Communicates in the workplace. | 2.01 Communicates with co-workers. | 2.02 Communicates with other disciplines. | 2.03 Communicates with apprentices. | 2.04 Uses hand signals. | 2.05 Communicates electronically. |
| | 3. Uses and maintains tools and equipment. | 3.01 Uses hand tools. | 3.02 Uses power tools. | 3.03 Uses powder-actuated tools. | 3.04 Uses aerial work platforms. | 3.05 Uses ladders. |
| | | 3.06 Uses scaffolding. | 3.07 Uses personal protective equipment (PPE). | 3.08 Uses surveying equipment. | 3.09 Uses welding equipment. | 3.10 Uses thermal and oxy-fuel cutting equipment. |
| | 4. Organizes work. | 4.01 Organizes materials and supplies. | 4.02 Marks layouts. | 4.03 Maintains safe work environment. | 4.04 Assesses site hazards. | 4.05 Plans work tasks. |
| B - RIGGING AND HOISTING | 5. Selects rigging equipment. | 5.01 Matches load to lift capability. | 5.02 Inspects rigging equipment. | 5.03 Maintains rigging equipment. | | |
| | 6. Uses hoisting and lifting equipment. | 6.01 Uses hoisting equipment. | 6.02 Uses lifting equipment. | 6.03 Attaches rigging to load. | | |

| BLOCKS | TASKS | SUB-TASKS | | | |
|---|---|---|---|---|---|
| C - CRANES | 7. Assembles and erects cranes. | 7.01 Assesses site hazards. | 7.02 Determines crane position. | 7.03 Prepares bases. | 7.04 Erects cranes. |
| | 8. Disassembles cranes. | 8.01 Disassembles crane components. | 8.02 Prepares crane for transport. | | |
| D - ERECTION, ASSEMBLY AND INSTALLATION | 9. Installs primary and secondary structural members. | 9.01 Erects falsework. | 9.02 Attaches structural members. | 9.03 Levels, plumbs and aligns structural members. | 9.04 Completes installation of structural members. |
| | 10. Installs ornamental components and systems. | 10.01 Installs curtain walls. | 10.02 Installs miscellaneous components. | | |
| | 11. Installs conveyors, machinery and equipment. | 11.01 Installs material handling systems. | 11.02 Aligns material handling systems. | 11.03 Places machinery and equipment. | |
| E - MAINTENANCE AND UPGRADING | 12. Repairs components. | 12.01 Assesses current condition of components. | 12.02 Field-fabricates components. | 12.03 Replaces components. | 12.04 Performs preventative maintenance. |
| | 13. Dismantles and removes structural, mechanical and miscellaneous components. | 13.01 Ensures decommissioning of structure or components. | 13.02 Plans sequence of disassembly. | 13.03 Removes components. | |